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TOWARDS A CONCEPTUAL MAP OF IT GOVERNANCE: A REVIEW OF CURRENT ACADEMIC AND PRACTITIONER THINKING

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Abstract

The performance of many organisations relies on the effective use of Information Technology (IT). A mechanism to achieve this goal is the introduction of IT Governance to control and manage IT. This paper is a critical review of the IT Governance literature which has been undertaken for the purpose of developing a conceptual map of IT Governance and to provide an overview of the current understanding within the field of IT Governance.

IT Governance consists of the leadership, organisational structures, processes, and relational mechanisms to ensure that the enterprise's IT sustains and extends the organisation's strategies and objectives. It needs to be an integral part of Corporate Governance and to be defined as the responsibility of executives and the board of director.

Our literature review demonstrates that IT Governance is a rather new concept with initial research focused on IT Governance arrangements with a variety of models and techniques to support its introduction. We consider that an integrated perspective is needed to assist managers in navigating a path from strategy to execution. The proposed conceptual map of IT Governance establishes relationships between its components, corporate governance, influence factors, goals, arrangements, and IT Management to assist the understanding in IT Governance and to identify future research areas.

Keywords: Corporate Governance, IT Governance

1.0 Introduction

IT governance supports the effective use of IT through sound leadership, organisational structures and processes designed to meet the business strategies and objectives (IT Governance Institute, 2003). Researchers and practitioners conceptualise IT Governance in different ways and use a variety of lenses to examine the subject. This paper presents a current understanding of IT Governance and associated research by describing its components referring to the most influential models. The IT Governance literature review conducted forms the core sections of this paper and leads to the development of an integrated perspective through a conceptual map.

In order to understand IT Governance, one has to appreciate Corporate Governance, which encourages organisations and its agents to behave responsibly to benefit the stakeholders. These objectives apply also to IT. As IT is used extensively in the business environment and many organisations are dependent on IT, effective governance of IT is becoming more important. IT Management has in recent years been regarded as not delivering adequate value. Failure to govern IT adequately can result in insufficient financial return of IT investments, large financial losses, and an increased risk profile of the organisation. The current financial crisis has shown that failing governance implementations affect organisations and economy (Simms, 2008).

The structure of this paper is as follows. After positioning the paper and introducing its structure, the second section will position IT Governance in relation to Corporate Governance and its influence factors. A reflection of IT Governance definitions will be portrayed. The sections three, four and five will present and structure the concept of IT Governance in the new way of goals, scope, and arrangements. . The last section will depict a conceptual map of IT Governance illustrating how the various components introduced in the previous sections relate to each other, which future research opportunities are proposed, and what the conclusions are.

2.0 Definitions and Influence Factors

The definition, goals, arrangements, and scope of IT Governance are regarded as a subset of the IS field of study defined by Davies et al. (1997, p7) encompassing '(1)

Acquisition, deployment, and management of information technology resources and services (the information systems function) and (2) Development and evolution of infrastructure and systems for use in organization processes (system development)'. IT Governance arrangements represent 'patterns of authority for key IT activities in business firms, including IT infrastructure, IT use, and project management' (Sambamurthy & Zmud, 1999, p262). An information system is not equivalent to the field of IS and is defined as 'a collection of interrelated components (hardware, software, procedures, people, databases)' (Khazanchi & Munkfold, 2000, p31) that work together to 'collect (or retrieve), process, store, and distribute information to support decision making and control in an organization' (Laudon & Laudon, 1999, p7).

2.1 IT Governance in the Context of Corporate Governance

Various publications suggest that IT Governance is an integral part of corporate governance (IT Governance Institute, 2003; Van Grembergen et al., 2004; Lainhart IV, 2000). Corporate Governance is defined as *'the system by which companies are directed and managed. It influences how the objectives of the company are set and achieved, how risk is monitored and assessed, and how performance is optimised.'* (Webb et al., 2006, p2). The Organisation for Economic Co-Operation and Development (OECD) enhances this definition by adding the relationship aspect. Corporate governance includes *'a set of relationships between a company's management, its boards, its shareholders, and other stakeholders'* (OECD, 2004, p11). Some definitions of corporate governance emphasise the control aspect instead of the management aspect by replacing 'managed' with 'controlled' in their definition (Standards Australia, 2005; Lainhart IV, 2000; Rathmell et al., 2004). This emphasises the aspect of steering and strategic direction over daily operations. Within the Combined Code on Corporate Governance (June 2006), The Financial Reporting Council (2006, p14) defines the principle C.2 Internal Control outlining the boards responsibility to *'maintain a sound system of internal control to safeguard shareholders' investments and the company assets'*. As IT is regarded as an asset of the company (Dahlberg & Lahdelma, 2007; Heier et al., 2007; IT Governance Institute, 2007), the link between corporate and IT Governance is established which is confirmed by various authorities (Chulani et al., 2006; Dahlberg & Lahdelma, 2007;

De Haes & Van Grembergen, 2004; Guide Share Europe, 2004; Stutz, 2006; Van Grembergen et al., 2004).

Corporate Governance is addressing the issues of the agency conflict (Gill, 2008) by specifying the decision-making rules for the organisation. Outcomes are accountability and transparency focusing on the shareholders view. Concurrently, Corporate Social Responsibility (CSR) proposes that organisations need to take into account ethical considerations and act responsibly expanding Corporate Governance to all stakeholders.

The identified commonalties between the components of corporate and IT Governance are value delivery and risk management where the difference is in scope. Corporate Governance focuses more on strategic direction for the organisation whereas IT Governance focuses on strategic alignment, as IT is one functional area of the organisation and stresses the delivery of business value through IT. Corporate Governance takes into account all internal and external stakeholders, whereas the focus of IT Governance is on the internal stakeholders resulting in accountability and responsibility towards the organisation itself and all other stakeholders.

2.2 IT Governance and its Influence Factors

The design of IT Governance arrangements is influenced by internal and external contingencies. The seminal research of Sambamurthy and Zmud (1999) defines

- corporate governance (overall governance mode, firm size),
- economies of scope (diversification mode, diversification breath, exploitation strategy for scope economies), and
- absorptive capacity (line IT knowledge)

as the three determinants of a company's IT Governance arrangement. The list of identified influence factors in other research is extensive and includes for example (additionally to the above-mentioned determinants) industry, geography, external environment, organisation's culture, structure, strategy, and role of IT.

Lately, regulatory influence factors gain importance. In 2002, the Sarbanes-Oxley Act was introduced in the United States of America, which had implications on

governance for listed companies. The focus was to improve corporate governance by implementing measures that *'will augment internal checks and balances and, ultimately, strengthen corporate accountability'* (Damianides, 2005, p77). Much of the attention is focused on section 404 of the act under which management need to certify the internal controls of the organisation are in place and effective. In the effort to achieve compliance, some organisations rely on existing IT Governance frameworks like COBIT (Control Objectives for Information and related Technology).

2.3 IT Governance Definitions

A widely used IT Governance definition is put forward by the IT Governance Institute (2007, p5) as part of Control Objectives for Information and related Technology (COBIT) stating *'IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organisational structures and processes that ensure that the enterprise's IT sustains and extends the organisation's strategies and objectives.'*

This definition does not adequately address goals and people aspects when compared to other IT Governance definitions (Simonsson & Johnson, 2005). Heier et al. (2007, p2) define IT Governance *'as the set of enabling mechanisms to request, prioritize, sponsor, fund, monitor, and enforce IT investment decisions'* concentrating on the aspect of delivering business value through IT. Weill and Woodham (2002, p1) emphasise the decision making process within IT Governance when postulating the definition *'IT governance [... is] specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT'*. These definitions emphasise the decision process within IT and do not adequately address the aspects of monitoring and stakeholders.

Peterson (2004, p71) suggests that *'IT Governance describes (1) the distribution of IT decision-making rights and responsibilities among different stakeholders in the organization, and (2) the rules and procedures for making and monitoring decisions on [sic] strategic concerns.'* This definition covers many of the dimensional units of an IT Governance definition but does not address the allocation of responsibility to a specific stakeholder group. The IT Governance definition of Smith and McKeen

(2006) contains the equivalent components to Peterson and reinforces the objective of achieving enterprise goals and balancing risks versus return. Standards Australia emphasise the system character by defining IT Governance as *'the system by which the current and future use of ICT is directed and controlled'* (Standards Australia, 2005, p6) which is not sufficiently specific about the components of the system, the stakeholders, and the scope.

The definition of the IT Governance Institute could be amended to include relational mechanisms and the use of IT. We will use this definition going forward based on the assumption it represents most coherently the used definitions in the literature and covers all dimensional units of IT Governance. *'IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organisational structures, processes, and relational mechanisms that ensure that the organisation's IT sustains and extends the organisation's strategies and objectives and encourages desirable behaviour in the use of IT.'*

3.0 Goals of IT Governance

This section will introduce the five goals of IT Governance. While corporate governance facilitates the consistency of decisions with the corporate goals and strategy, IT Governance assists the IT department to help achieve the corporate goals. Organisations will implement IT Governance differently depending on its goals and objectives.

The IT Governance Institute (2007; 2003) describes the IT Governance goals as

- aligning business and IT,
- IT enables the business and maximises benefits,
- IT resources are managed and used responsibly, and
- IT risks are managed.

Patel (2004, p82) specifies the goals of IT Governance in more detail when suggesting that the main aim of IT Governance is to *'contribute to business activity in terms of lower costs, satisfied customer and better quality products or service provided by a company'*. Robinson (2005, p45) identifies the goals of IT Governance with a wider

scope and adds the usage of IT in stating the goal of IT Governance is *'to create a control environment for desirable actions to drive the effective, efficient, and secure use of information technology'*. Certain IT Governance goals received greater attention (strategic alignment, delivery of business value, policy, and procedures) than others (performance management, risk management, control, and accountability) (Webb et al., 2006). PricewaterhouseCoopers (2007) reported in a study that achieving alignment of IT with the business is a major driver and result of IT Governance.

Ask et al. (2007) interviewed 25 CIOs focusing on 7 benefits of IT Governance of which 5 correspond directly to the IT Governance goals and investigates all IT Governance goals simultaneously. Some authors (Guldentops, 2004; IT Governance Institute, 2007) extend the above stated goals of IT Governance by adding performance management. The goals of IT Governance are seen consistent with the IT Governance Institute (2007) and are strategic alignment, value delivery, risk management, resource management, and performance management summarised in Figure 3-1.

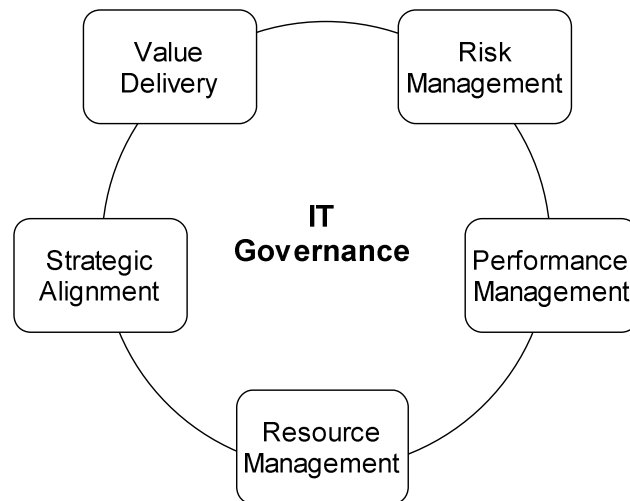


Figure 3-1: IT Governance Goals (adapted from IT Governance Institute, 2007)

IT Governance is mainly about IT delivering value to the business and mitigation of IT risks (IT Governance Institute, 2003). The goal of IT value delivery is only achieved if the other four IT Governance goals are attended to where value delivery is driven by Business and IT alignment. Strategic alignment is driving IT's value

delivery. Risk management is driven by '*embedding accountability into the enterprise*' (IT Governance Institute, 2003, p19). The IT Governance Institute (2003) classifies the present five focus areas as outcomes (value delivery and risk management) and drivers (strategic alignment, resource management, and performance management) all focused on stakeholder value.

IT Governance facilitates the achievement of a balance in risk and rewards. The IT Governance Institute (2007) summarized each goal in the following way:

1. Strategic alignment focuses on ensuring the linkage of business and IT plans, defining, maintaining and validating the IT value proposition, and aligning IT operations with enterprise operations. Luftman and Brier (1999) applied the Strategic Alignment Model of Henderson and Venkatraman (1999) in their multi-year study. The most important enablers and identifiers to achieve alignment between business and IT have been ascertained.
2. Value delivery is about executing the value proposition throughout the delivery cycle, ensuring that IT delivers the promised benefits against the strategy, concentrating on optimising costs, and proving the value of IT.
3. Risk management requires risk awareness by senior corporate officers, a clear understanding of the enterprise's appetite for risk, understanding of compliance requirements, transparency about the significant risks to the enterprise, and embedding of risk management responsibilities into the organisation. Jordan (2005) conducted an exploratory case study to develop an IT risk portfolio containing the IT risk areas projects, IT service continuity, information assets, service providers & vendors, applications, infrastructure, and strategic & emergent.
4. Resource management is about the optimal investment in, and the proper management of, critical IT resources: applications, information, infrastructure, and people. Key issues relate to the optimisation of knowledge and infrastructure.
5. Performance measurement tracks and monitors strategy implementation, project completion, resource usage, process performance and service delivery, using, for example, balanced scorecards that translate strategy into action to achieve goals measurable beyond conventional accounting.

4.0 Scope of IT Governance

IT defined as '*resources required to acquire, process, store and disseminate information*' (ISO & IEC, 2008, p4; Standards Australia, 2005, p6) is the scope of IT Governance. The IT resources include the hardware, software, and personnel used in supporting electronically based information processing, including data, text, voice, and image forms of information (Boynton & Zmud, 1987).

To IT Governance associated subjects are Information Governance, IT Management, Strategic Information Systems Planning (SISP), and the related frameworks COBIT and Val IT, IT Infrastructure Library (ITIL), and ISO/IEC 17799 as presented in Figure 4-2.

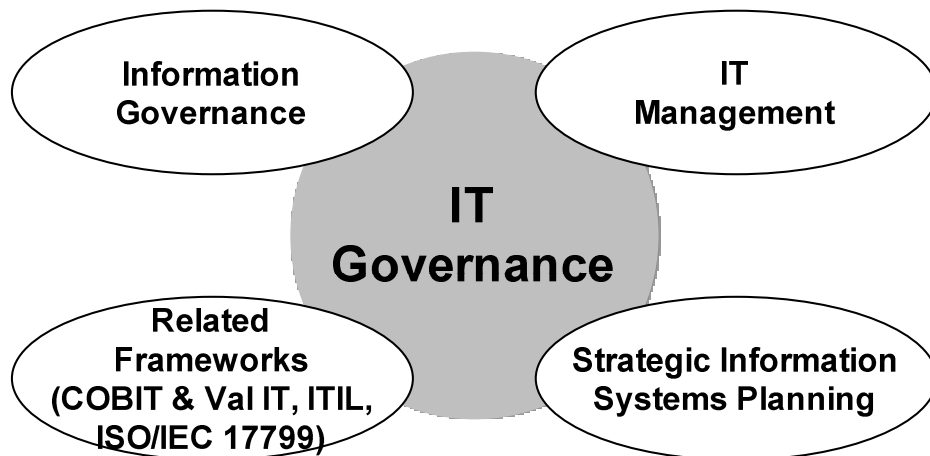


Figure 4-2: Related Subjects of IT Governance

4.1 Information Governance

IT Governance is distinguished from Information Governance in the scope it is concerned with. Information Governance is focused on information and is defined as '*a structure of relationships and processes, specifying the framework for decision rights and accountabilities toward information, so as to encourage desirable behavior in the use of information for achieving the enterprise's goals*' (Manwani et al., 2008, p42) which is based on the combination of the two IT Governance definitions of the IT Governance Institute (2003) and Weill and Ross (2004) mainly replacing IT with information. The quality of information in this context of governance is important. Is the focus on confidentiality, integrity and availability of information, one would refer

to Information Security Governance. Combining information with technology and people, Manwani et al. (2008; Manwani, 2007) proposes a holistic information management framework (Figure 4-1) presenting four information worlds and information quality as the key elements of information governance.

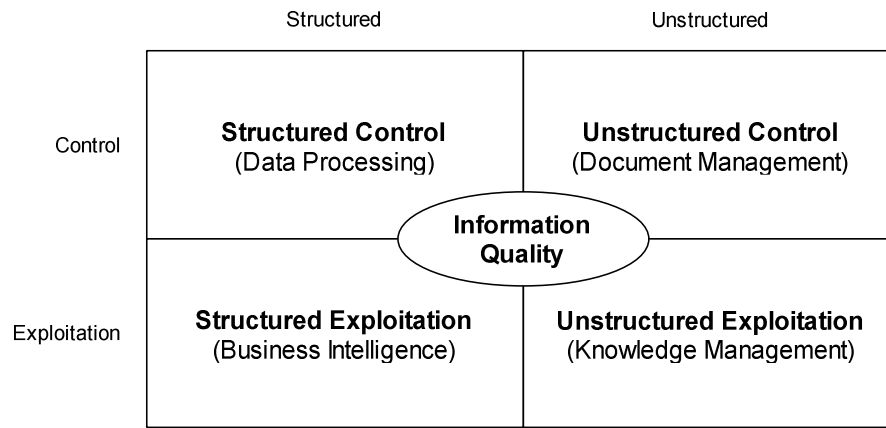


Figure 4-1: Information Management Framework (adapted from Manwani, 2008, p40)

Control ‘requires validated records to be held securely with data that is ideally captured once at source and validated [where] exploitation requires providing access to information to empowered users who are supported by the relevant analytical and sharing tools’ (Manwani et al., 2008, p38). Four quadrants are formed when combining control and exploitation with structured and unstructured information.

4.2 IT Management

IT Management is concerned with ‘*internal effective supply of IT services and products*’ (Peterson, 2004, p44; Van Grembergen et al., 2004, p5). IT Management and IT Governance can be distinguished based on the two dimensions of time and business orientation depicted in Figure 4-3. IT Management maintains a focus on present time and internal customers (Van Grembergen et al., 2004; Peterson, 2004). IT Governance is broader in scope and focuses on ensuring IT meets current and future requirements of the business and its external customers.

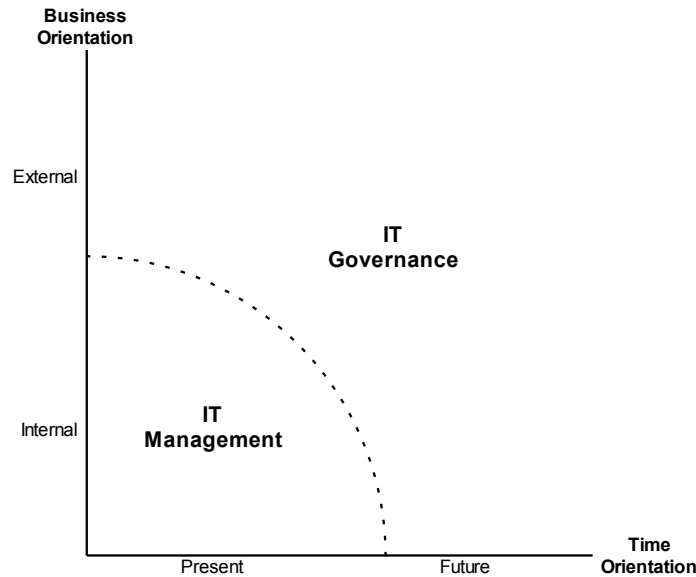


Figure 4-3: IT Management and IT Governance (adapted from Peterson, 2004)

IT Governance addresses the erroneous belief that *'the value of IT is in its possession'* (Peppard, 2007, p338) and does not try to manage IT per se but to manage business value delivery through IT. IT Management functions in the settings of IT Governance and *'concentrates on the effective and efficient running of IT operations and services'* (Bhattacharjya & Chang, 2006, p2). Peterson (2004) presented the paradigm shift from the principles of control, authority, and efficiency to collaboration, competency, and flexibility. Using these two paradigms, IT Management (represented by the old paradigm) and IT Governance can be differentiated. One can postulate that the focus of IT Governance is on horizontal coordination (i.e. IT and business) whereas IT management focuses on vertical coordination (i.e. within IT).

4.3 Strategic Information Systems Planning

Strategic Information Systems Planning (SISP) is the *'process of determining an organization's portfolio of computer-based applications that will help it achieve its business objectives'* (Lederer & Sethi, 1996, p17; Newkirk & Lederer, 2007, p34; Philip, 2007, p247). The objectives of SISP are a) aligning investment in IS with business goals, b) exploiting IT for competitive advantage, c) directing efficient and effective management of IT resources, and d) developing technology policies and architectures (Van Grembergen et al., 2004). SISP is successful when the objectives

of SISP are attained (Newkirk & Lederer, 2007) which is equivalent to the success criteria for IT Management.

Lederer and Sethi (1988) state that SISP and IT Management were of interest as early as in the 1970s whereas IT Governance came into focus in 1990s (Webb et al., 2006). Comparing SISP and IT Governance shows that the breadth of areas covered in IT Governance is wider than in SISP. SISP focuses on applications, data, and technology (Byrd et al., 2006). IT Governance addresses these areas also and enhances its scope to include appropriate structures, processes, and relational mechanisms.

Three of the five goals of SISP and IT Governance correspond approximately. Strategic alignment, contribution, and improvement of capabilities of SISP relate to the IT Governance goals of strategic alignment, IT value delivery, and IT resources management. Not covered as goals of SISP is the aspect of managing risks. SISP goals are more IT internally oriented than focused on the governance aspects of IT as part of corporate governance.

4.4 COBIT, VAL IT, ITIL, and ISO/IEC 17799

Control Objectives for Information and related Technology (COBIT) will be introduced in section 5 and is positioned within the process dimension of the structures, processes and mechanisms of IT Governance (De Haes & Van Grembergen, 2004) and achieves business and IT alignment by aligning the business goals to IT goals. Additional to the control-objective framework, management guidelines are included to define critical success factors, key goal and key performance indicators, and maturity models (Lainhart IV, 2000). In 2008, the IT Governance Institute published Val IT which is complementary to COBIT and focuses on 'helping enterprises optimise the realisation of value from IT investments' (IT Governance Institute, 2008). The Val IT Framework 2.0 consists of the three domains value governance, portfolio governance, and investment governance and is focused on the enterprise governance view. COBIT relates to the IT view. Within Val IT, 6 principles and 22 corresponding processes are defined. The scope is not only the IT-enabled business investment programmes but also existing IT services, assets, and resources.

The IT Infrastructure Library (ITIL) is developed by the Office of Government Commerce in 1989 and represents a set of process-based best practises for IT service management (Peppard, 2004). ITIL is a widely accepted framework for IT service delivery (Cartlidge et al., 2007; Johnson et al., 2007; Larsen et al., 2006; Lindquist et al., 2007; Office of Government Commerce, 2008) and is used for process implementations (De Haes & Van Grembergen, 2004) within the structures, processes and relational mechanisms of IT Governance. IT organisations implementing ITIL set out to achieve the state where they *'efficiently and reliably manage services and to satisfy performance, availability, and cost objectives'* (Johnson et al., 2007, p585).

Information security is concerned with preserving confidentiality, integrity, and availability of information and is often related to corporate governance (Da Veiga & Eloff, 2007; Von Solms, 2005). It was developed from being focused on technical aspects of securing the IT environment to information security governance addressing the executive responsibility and covering organisational issues (Da Veiga & Eloff, 2007). Security threats for organisations originate from a variety of sources, including fraud, sabotage, denial of service attacks, etc. Various reference frameworks can be applied (e.g. ISO/IEC 17799, COBIT, ITIL) but based on its wide adaptation and comprehensiveness, ISO/IEC 17799 is further illustrated (Saint-Germain, 2005; IT Governance Institute, 2006). The current version of ISO/IEC 17799 was published by the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) in 2005 and was replaced internationally by ISO/IEC 27002:2005 and in Britain by BS ISO/IEC 27001:2005 (British Standards Institution, 2007) in 2005. The various categories contain control objectives with recommended controls. ISO/IEC 17799 is integral and complementary to IT Governance and details the aspect of information security management. COBIT and ISO/IEC 17799 are also complementary with COBIT being broader in scope and providing broader coverage of IT Governance. ISO/IEC 17799 is focusing in more detail on security and its implementation (Saint-German, 2005; Von Solms, 2005) named to cover a *'discrete area'* Williams (2006, p2).

5.0 IT Governance Arrangements

Sambamurthy and Zmud (1999, p262) define IT Governance arrangements as *'patterns of authority for key IT activities in business firms, including IT infrastructure, IT use, and project management'*. When reviewing IT Governance arrangements, the two perspectives of structure and process can be distinguished (Dahlberg & Kivijärvi, 2006, p2). The structural perspective dates back to the 1970s and refers to IT Governance arrangements, which investigate the factors that influence IT Governance arrangements. Dahlberg and Kivijärvi (2006) argue that the structural perspective of IT Governance needs to be augmented with the procedural perspective and state *'The process perspective is inherent in several IT Governance frameworks or models'* and refer to *'decision-making and monitoring processes, and the mechanisms that support IT governance'* (Dahlberg & Kivijärvi, 2006, p3).

5.1 Structures, Processes, and Relational Mechanisms

In the context of integrating the strategic decision making of IT, Peterson (2004) defines the mechanisms that support IT Governance as being structures, processes, and relational mechanisms. In Table 5-1, the existence of accountable functions are summarised as structures. Processes represent formalised IT decision-making and monitoring procedures. Relational mechanisms are divided into structures and processes, which implement the dialogue and collaboration between the various stakeholders.

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The following table provides a summary of Peterson's IT Governance arrangement containing structures, processes, and relational mechanisms.

	(1) Structures	(2) Processes	Relational Mechanisms	
			(3) Structures	(4) Processes
Tactics	IT Executives & Accounts Committees & Councils	Strategic IT Decision-Making Strategic IT Monitoring	Stakeholder Participation Business-IT Partnerships	Strategic Dialogue Shared Learning
Mechanisms	<ul style="list-style-type: none"> • CIO on Board • IT program managers • IT relationship managers • IT executive councils • eBusiness advisory board • eBusiness task force • IT standing teams 	<ul style="list-style-type: none"> • Balanced (IT) Scorecard • Critical Success Factors • Scenario analysis • SWOT analysis • Strategic Alignment • Information Economics • Service Level Agreements • IT benefits management 	<ul style="list-style-type: none"> • Active participation by principle stakeholders • Collaboration between principle stakeholders • Partnership rewards and incentives • Business/IT co-location • Business/IT 'virtual connection' 	<ul style="list-style-type: none"> • Shared understanding of business/IT objectives • Active conflict resolution ('non-avoidance') • Cross-functional business/IT training • Cross-functional business/IT job rotation

Table 5-1: Structures, Processes, and Relational Mechanisms of IT Governance
(Adapted from Peterson, 2004)

Table 5-1 presents the four types of integration strategies for governing IT effectively. Formal integration structures (1) refer to defined IT executives, accounts and implemented committees and councils. The objective of these structures is to improve the understanding of business needs by the IT managers and being able to act proactively. Formal integration processes (2) describe the '*formalization and institutionalization of strategic IT decision-making/monitoring procedures and performance*' (Peterson, 2004, p63) where these processes vary with levels of comprehensiveness, formalization, and integration. Formal integration structures and processes are often implemented top-down, are tangible, and have a tendency to be mandatory. Relational integration mechanisms consisting of structures and processes tend to be optional, intangible, and tacitly present. Only the combined existence of formal and relational integration mechanisms is sufficient to design effective IT Governance architectures in competitive environments (Peterson, 2004). Relational integration structures (3) define the implementation of how stakeholders interact to process discrepancies and solve problems resulting in participative behaviour. The involved stakeholders are corporate executives, IT management, and business

management. Relational integration processes (4) implement the strategic dialogue and shared learning between the stakeholders.

5.2 Centralized, Decentralized, and Federal IT Governance Modes

Sambamurthy and Zmud (1999) focus on identifying how various contingencies influence the three IT Governance modes centralized, decentralized, and federal. Various contingencies influence the patterns of authority for the IT activities regarding IT infrastructure, IT use and project management. The multiple, interacting contingencies of corporate governance, economies of scope and absorptive capacity influence the modes of IT Governance. In the centralized IT Governance mode, corporate IT possesses the authority in all three spheres of IT activities (IT infrastructure management, IT use management, and project management) whereas in the decentralized IT Governance mode the opposite is the case where the divisional IT and line management have the authority. The federal IT Governance mode is positioned between the central and decentralized mode.

5.3 Governance Arrangement Matrix

Weill and Ross (2004) define a governance arrangement matrix addressing the question of what decisions must be made and who should make them. The horizontal axis of the matrix represents the five types of IT decisions. The five decision types are presented in Table 5-2:

IT Decisions	Explanation
IT principles	Clarifying the business role of IT
IT architecture	Defining integration and standardization requirements
IT infrastructure	Determining shared and enabling services
Business application needs	Specifying the business need for purchased or internally developed IT applications
IT investment and prioritization	Choosing which initiatives to fund and how much to spend

Table 5-2: IT Decisions (Adapted from Weill & Ross, 2004)

The vertical columns of the governance arrangement matrix (Table 5-4) characterize the archetypes which define the people involved in the decision-making and who specifies the decision rights (Table 5-3).

Archetypes	Explanation
Business monarchy	Top managers
IT monarchy	IT specialists
Feudal	Each business unit making independent decisions
Federal	Combination of the corporate centre and the business units with or without IT people involved
IT duopoly	IT group and one other group (for example, top management or business unit leaders)
Anarchy	Isolated individual or small group decision making

Table 5-3: Archetypes (Adapted from Weill & Ross, 2004)

The study of Weill and Ross (2004) did unearth a pattern of how the typical organisation governs IT. Table 5-4 depicts a governance arrangement matrix of a typical organisation as found in the study.

	IT Principles	IT Architecture	IT Infrastructure Strategies	Business Application Needs	IT Investment
Business Monarch					●
IT Monarchy		●	●		
Feudal					
Federal				●	●
Duopoly	●			●	●
Anarchy					
Don't Know					

Table 5-4: Governance Arrangement Matrix (Adapted from Weill & Ross, 2004)

IT principles set the strategic role of IT are decided commonly in a duopoly approach between IT professionals and executive management. IT architecture and IT infrastructure strategy decisions are made by IT monarchies involving only IT professionals. There is not one typical approach for decisions regarding business application needs. In federal decision, corporate centre guidelines are taken into account. The IT professionals and the local management decide in the duopoly about business application needs. The three equally popular approaches of business monarchy, federal, and duopolies are employed in decision with regard to IT investments to ensure the organisation achieves the best value from the IT investments.

5.4 COBIT

The most frequently referred to process-oriented IT Governance framework is Control Objectives for Information and related Technology (COBIT), which is composed of four domains depicted in Figure 5-1. The IT Governance Institute published COBIT in its latest version 4.1 as an open standard for IT Governance (Smith & McKeen, 2006) in 2007. The framework provides a generic process model for all processes normally found in IT functions (Guldentops, 2004) and its four domains cover 34 processes with one control objective each and is widely adopted. These complete process list where many organisations will not have this COBIT-oriented IT process structure in place. COBIT takes the IT Governance, compared to Val IT that takes the corporate governance view (IT Governance Institute, 2008).

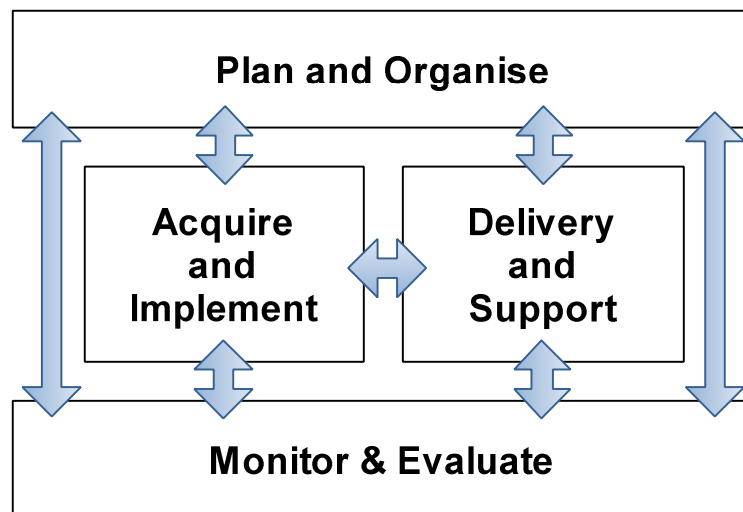


Figure 5-1: COBIT Processes (adapted from IT Governance Institute, 2007)

The four domains encompass IT's traditional responsibilities of plan, build, run, and monitor. The domain 'Plan and Organise' provides direction in how IT can support the business objectives in the best way. The defined direction is translated into plans for the other three domains, communicated, and managed. Example processes are Define a strategic IT plan, Manage IT investments, Assess and manage IT risk, or Manage projects. 'Acquire and Implement' identifies, develops or acquires the solutions and implements and integrates them into the business processes. Next to implementation of new systems, also changes to existing systems are included in this domain. Example processes of this domain are Acquire and maintain application software, Procure IT resources, or Manage changes. 'Delivery and Support' receives the solutions from the 'Acquire and Implement' domain and makes them usable for the end users. Service delivery, security & continuity management, user support, and management of operational facilities are part of this domain. Example processes are Define and measure service levels, Ensure system security, Manage service desk and incidents, or Manage the physical environment. 'Monitor and Evaluate' monitors all processes to ensure that the direction provided is followed. Performance management and monitoring internal control and regulatory compliance are part of this domain. Example processes are Monitor and evaluate IT performance, Ensure compliance with external requirements, or Provide IT governance.

Additional to this control based process framework, COBIT provides various other IT Governance related information like IT Governance definitions, goals, IT balanced scorecard, a capability model, and further information for its implementation.

5.5 IT Governance Framework

Figure 5-2 depicts the IT Governance framework proposed by Dahlberg and Kivijärvi (2006) integrating the structural and process perspective of IT Governance. IT Governance implementations are divided into the three phases of 'Planning', 'Operating', and 'Evaluation' and the feedback phase of IT Governance Development. Acknowledging the statement that systems are steered by structures and processes and structures change through processes, the framework is a system model. The referenced process includes the structures behind the processes. The IT Governance framework combines the goals of IT Governance with the processes

necessary, presents the broadest scope of IT processes, and introduces the IT Governance implementation lifecycle oriented processes

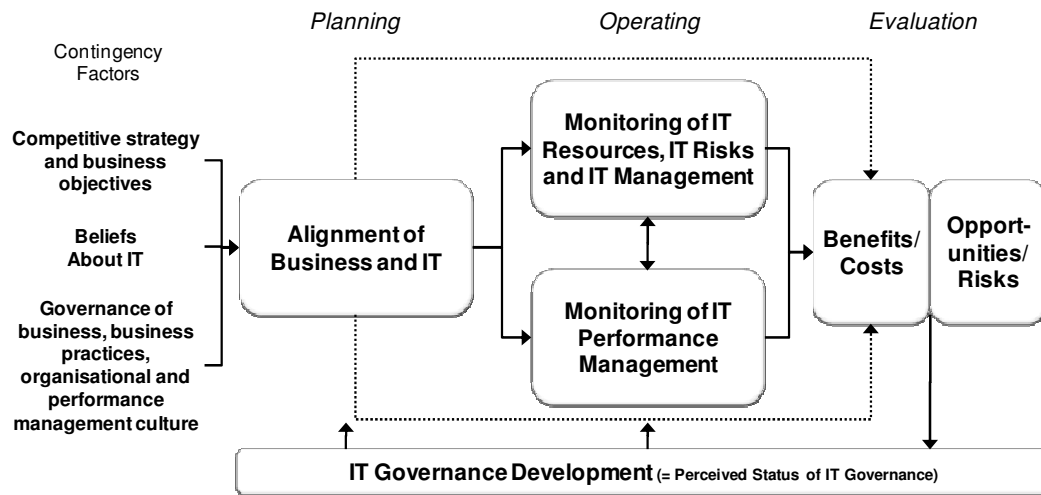


Figure 5-2: IT Governance Framework (adapted from Dahlberg & Kivijärvi, 2006)

The process of IT governance starts in the planning phase with business and IT alignment. The alignment is impacted by the contingency factors of an organisation's competitive strategy and business objectives, its beliefs about IT, and its business governance, business practices, and organizational and performance measurement culture. The perceived status of IT governance representing the '*perceived value and business opportunities delivered by IT*' impacts also the process 'Alignment of Business and IT' (Dahlberg & Kivijärvi, 2006, p6). Business and IT alignment guides the two processes of the operating phase. 'Monitoring of IT Resources, IT Risks and IT Management' is guided on how to organise IT processes and how the resource allocation to those processes is implemented. IT risk management and IT management are also directed by the business and IT alignment. This process of 'Monitoring of IT Resources, IT Risks and IT Management' is also impacted by the process 'Monitoring of IT Performance Management' and the perceived status of IT Governance. Depending on business and IT alignment, the process 'Monitoring of IT Performance Management' defines how the targets of IT are cascaded through the organisation and how IT processes are measured. The one process of the 'Planning' phase and the two processes of 'Operating' phase impact the business value (revenue minus costs) and what future business opportunities (opportunities minus risks) IT delivers. This constitutes the 'Evaluation' phase. The last phase of 'IT Governance Development'

represents the perceived status of IT Governance and is defined as *‘those activities and processes by which IT governance is improved and supported by IT governance feedback and evaluation information’* (Dahlberg & Kivijärvi, 2006, p7).

The standard ISO 38500 provides a framework of principles to direct, evaluate, and monitor the use of IT (ISO & IEC, 2008) and is published by the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC). The basis for this standard is the Australian standard for Corporate Governance of Information & Communication Technology AS0815 (2005).

5.6 Critique

An advantage of Peterson’s mechanisms of structures, processes, and relational mechanisms is the distinction of formal versus informal mechanisms that support IT Governance. Other IT Governance frameworks merely focus on explicit structures and processes. Peterson’s framework of IT Governance does not provide details of which the formal integration processes are that need to be in place and therefore implementation guidance of this framework is limited. The focus of this framework is on strategic decision-making only not providing further details of tactical and operational decision-making. IT Governance is seen as focusing on strategic decision-making, which is in line with Petersons view distinguishing IT Governance and IT Management. However, it is not apparent in the framework how IT Governance and IT Management are connected.

Sambamurthy and Zmud postulate that the contingencies of corporate governance, economies of scope and absorptive capacity influence the patterns of authority for the IT activities regarding IT infrastructure, IT use and project management. The research is based on multiple contingency theory and takes the research further then only single contingencies. However, the employed contingencies do not represent all possible influence factors as e.g. industry, organisational culture, or business strategy and does not distinguish different IT governance modes in the business units of an organisation. The IT governance modes do not provide details of the IT processes necessary to govern IT and does not

The governance arrangement matrix of Weill and Ross is focusing on what decisions need to be made by whom focusing on decision rights. Application of this framework in organisations requires details of the processes necessary to implement IT Governance.

COBIT is all-encompassing regarding the IT processes of plan, build, run, and monitor and the lifecycle of IT Governance. A main advantage over other frameworks is that COBIT also provides definitions and goals of IT Governance, which acts as language unification in the field. Implementation support is given by providing capability models, balanced scorecards, etc. Within COBIT, IT Governance is regarded as continuous process. If guidance in effectiveness is thought, then Val IT, which focuses on strategy and value, is more appropriate to be used. If the driver is efficiency, then COBIT provides better guidance as it concentrates on architecture and delivery.

The IT Governance framework of Dahlberg and Kivijärvi aims to support the use of COBIT or ITIL by facilitating an executive level holistic IT governance review. This leads to the realization that the framework is not detailed enough for implementation guidance. All processes of IT are covered. This is the only framework that explicitly structures IT Governance from a lifecycle perspective (planning, operating, and evaluation) and presents the according processes.

As the IT Governance arrangements implementation is dependent on the organisation's goals, which vary across organisations, a selection of a preferred framework is difficult. Of the presented frameworks, the COBIT framework is most frequently used and seen as the defacto standard of IT Governance. With the broad scope of covering all IT processes and explicit guidance on its implementation, many professionals in the field of IT Governance use the framework as guidance. It is important to implement explicit structures and processes together with implicit coordination mechanisms to achieve effective IT Governance.

6.0 Developing a Map of Integrated Components

6.1 Making it Work

Figure 6-1 aims to relate the components of IT Governance which are corporate governance, influence factors, goals, arrangements, and IT Management. The objective of the conceptual map is to provide a structure to understand IT Governance in an integrated way with the view of improving the value of IT through increased efficiency and effectiveness of IT resourcing. The depicted components and relationships are based on the presented literature review. Addressing the lifecycle of IT Governance, the conceptual map incorporates the components that need to be considered when designing, implementing, operating, and evaluating IT Governance.

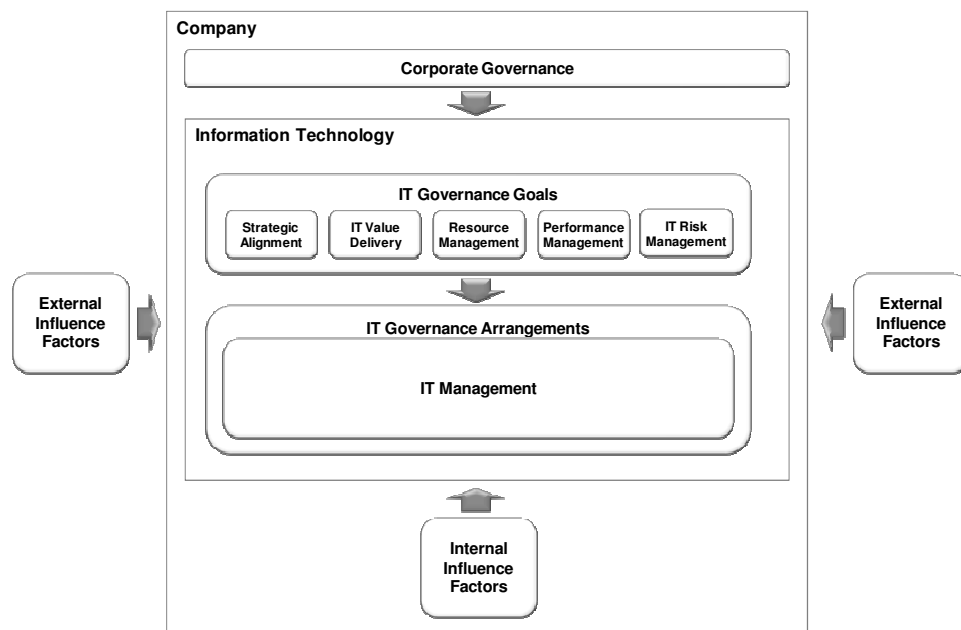


Figure 6-1: Conceptual Map of IT Governance Components

Table 6-1 summarizes the sources for the proposed conceptual map of IT Governance components.

Component/Relationship	Source
Corporate Governance influences IT Department	Lainhart IV, 2000 IT Governance Institute, 2003 Van Grembergen et al., 2004
IT Governance influenced by factors	Dahlberg and Kivijärvi, 2006 Sambamurthy & Zmud, 1999
Goals of IT Governance drive IT Governance Arrangements	IT Governance Institute, 2003 Dahlberg and Kivijärvi, 2006
Goals of IT Governance	IT Governance Institute, 2007 Robinson, 2005
IT Governance Arrangements	Dahlberg and Kivijärvi, 2006 IT Governance Institute, 2007 Peterson, 2004 Ross & Weill, 2004
IT Management within IT Governance Arrangements	Bhattacharjya & Chang, 2006

Table 6-1: Sources of Proposed Conceptual Map of IT Governance components

The structural perspective of IT Governance established that various factors influence the organisation and IT Governance arrangements. External influence factors like politics, economy, society, technology, laws, and environment affect the organisation in which IT Governance is implemented. Corporate Governance provides the context for and influences the IT department of organisations. Influence factors within the organisation shape IT and IT Governance. Within IT, the goals of IT Governance affect how IT Governance is implemented resulting in various arrangements. The goals of IT Governance drive the IT activities (IT Governance Institute, 2003) and how they are put into practice. IT Management operates in the context of IT Governance arrangements to deliver the IT services and manages the current IT operations.

6.2 Future Research

The literature review has shown that the publications in the field of IT Governance focus on IT Governance arrangements. IT Governance goals and IT Governance content are implicitly included in the research of the other IT Governance

components. There is a common understanding in the scope of IT Governance where the focus is on IT and does not explicitly state information.

Figure 6-2 presents the main publications introduced in the previous literature review sections. The horizontal axis presents the IT Governance components of goals, arrangements, and scope. Each reference is positioned within the component that forms the core content of the publication.

	IT Governance Goals	IT Governance Arrangements	IT Governance Scope
2008		ISO & IEC, 2008	Office of Government Commerce, 2008
2007	IT Governance Institute, 2007		British Standards Institution, 2007 Newkirk & Lederer, 2007, Philip, 2007
2006	Webb et al., 2006	Dahlberg & Kivijärvi, 2006	Bhattachariya & Chang, 2006
2005	Robinson, 2005	Standards Australia, 2005	
2004	Guldentops, 2004 Patel, 2004	Peterson, 2004 Weill & Ross, 2004	De Haes & Van Grembergen, 2004 Van Grembergen et al., 2004
2003 - 2000	IT Governance Institute, 2003		
1999 - 1995		Sambamurthy & Zmud, 1999	Lederer & Sethi, 1996

Figure 6-2: Main IT Governance Publications

Much of the research into effective IT governance processes is currently ‘*based on incomplete empirical evidence, has limited methodological rigor, and is prescriptive by nature*’ (Heier et al., 2007, p2). The empirical literature has only recently begun to move from ‘*supposition and casual empiricism*’ (Debreceeny, 2006, p2). The review of the research methodologies employed has shown that the positivism is the preferred epistemological stance. The research strategy of many studies is based on case study research. The paradigmatically most congruent research strategy identified for the

field of IT Governance is multi-case design based on a positivistic stance. Case studies are well suited to '*capture the knowledge of practitioners and developing theories from it*' (Benbasat et al., 1987, p370).

Many problems and questions within IT Governance have been identified and warrant further investigation. They range from the empirical research necessary to support the presented IT Governance arrangements, to the linkage of corporate and IT Governance and the design choices of organisations within that context, to how organisations need to implement IT Governance to balance IT value delivery and IT risks. The presented conceptual map of IT Governance components needs to be tested and supported by empirical evidence.

6.3 Conclusions

IT Governance is a relatively new and important field of study as it can contribute to more efficient and effective management and usage of IT, which is an organisation's valuable asset. A key finding of this paper is that the research into IT Governance is at an early stage of maturity. The most widely employed epistemological stance is positivism. Multi-case study research was frequently used and is well suited for this complex field of study.

Further, the research has focused on specific areas of IT Governance and concludes that this would benefit from an integrated perspective. The presented conceptual map facilitates the understanding of the structure and relationships of components of IT Governance which leads to better value from IT. Furthermore, it can be utilized by practitioners to review IT Governance implementations to ensure that the governance of IT is addressed in its comprehensiveness. The conceptual map also assists in identifying which future research opportunities exist as some of the components and relationships of components are not addressed adequately. There is broad agreement on IT Governance goals but while IT Governance arrangements have been proposed, the evidence and empirical tests are not consistently available. Finally, the link between corporate and IT Governance is established but the understanding of its design and implementation is limited.

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